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Biogenic Carbon: Its Joint Roles in Bioenergy and Carbon Sequestration

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Abstract:

Awareness of greenhouse gas contribution to global warming has led to a variety of strategies being proposed for carbon capture and greenhouse gas abatement. Simultaneously an interest in diversifying the fuel platform from fossil based to renewable sources, i.e. biogenic carbon, has led to development of bioenergy from wood chip, miscanthus and wheat straw. The Bioenergy Review, undertaken by The Committee on Climate Change in 2011, reviewed the potential of agricultural residues and woody biomass for energy generation in the UK. In a study of competing industrial uses for these bioenergy feedstocks undertaken by Poyry to support the review, several alternative applications were identified, including several which offered substitution potential (displacing fossil carbon) or carbon storage potential. One of these was the use of timber and engineered lumber in buildings. The built environment offers a chance to lock up carbon for a significant period, with design lives of over 50 years, and in many cases, service life may extend well over 100 years.

This paper will explore the GHG abatement potential of a model new town, demonstrating storage of sequestered carbon in buildings, and making comparison between building types. While such a new town is a model concept, it offers insight into the potential role of timber in long term storage of carbon, and offers an opportunity to compare carbon accounting within bioenergy (short cycle) and long cycle systems. Synergies between the two industries, and the potential compatibility of the two strategies to mutually achieve a reduction in greenhouse gas emissions within the UK will be highlighted. A discussion on wood industry co-products and wood waste from demolition, and carbon accounting for their role in bioenergy or energy from waste is timely.

Keywords: bioenergy, GHG abatement potential, construction

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